

## SECTION 27 3000

### VOICE COMMUNICATIONS

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#### LANL MASTER SPECIFICATION

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the ESM Electrical POC.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within "stars" during editing.

Specification developed for ML-3 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

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#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Overhead paging system

##### 1.2 LANL-FURNISHED AND INSTALLED EQUIPMENT

- A. LANL will furnish and install paging system electronic equipment in the telecommunications room(s).

##### 1.3 QUALITY ASSURANCE

- A. Comply with the National Electrical Code (NEC) for components and installation.
- B. Provide products that are listed and labeled by a Nationally Recognized Testing Laboratory (NRTL) for the application and environment in which installed.

##### 1.4 SUBMITTALS

- A. Submit the following in accordance with Section 01 3300, Submittal Procedures.
  - 1. Catalog data for cable, speakers, back boxes, and baffles.
  - 2. As-built documents showing paging system outlets, routing and size of raceways, junction boxes, and pull boxes.
  - 3. As-built records of cable routing and speaker circuiting.
  - 4. Test report for completed installation.

## 1.5 COORDINATION

- A. Schedule completion of the paging system installation to allow not less than 5 working days for the LANL Telecommunications Group to install paging system equipment before the scheduled start of paging system testing. Coordinate schedule with the LANL Telecommunications Group.

## 1.6 RECEIVING, STORING AND PROTECTING

- A. Receive, store, and protect, and handle products according to NECA 1 Standard Practices for Good Workmanship in Electrical Construction.

## PART 2 PRODUCTS

### 2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Alternate products may be accepted; follow Section 01 2500, Substitution Procedures.

### 2.2 CONDUIT

- A. Refer to Specification Section 26 0533, Raceways and Boxes for Electrical Systems.

### 2.3 BOXES

- A. Refer to Specification Section 26 0533, Raceways and Boxes for Electrical Systems.

### 2.4 SPEAKER CABLE

- A. Provide speaker cable, 18-gage minimum, stranded conductors, single twisted pair, non-shielded , PVC insulation and jacket:

- 1. 18 AWG: Belden #8461.

- 2. 16 AWG: Belden #8471.

### 2.5 SPEAKER ASSEMBLIES

- A. Provide recessed ceiling speaker assemblies consisting of a cone type speaker, 25-volt line matching transformer, speaker baffle, and a speaker enclosure: Dukane #6A634 with #8A301. (Bogen CSD 1X2 drop in speaker assembly is an acceptable substitute for ceiling tile installations.)
- B. Provide tile bridges to install speakers in lay-in ceiling systems: Atlas #81-8R.
- C. Provide re-entrant horn speaker assemblies consisting of a horn, driver, line matching transformer, and mounting bracket: Bogen #SPT-15A.

## 2.6 TERMINAL BLOCKS

- A. Provide DIN rail mounted, triple level, push-on style terminal blocks with associated mounting rails, markers, end/intermediate plates, and jumpers.
- B. Manufacturer: WAGO #280-547.

## PART 3 EXECUTION

### 3.1 EXISTING WORK

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Delete this article when existing construction is not affected.

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- A. Remove exposed abandoned paging system components, including abandoned speaker cable and raceways above accessible ceiling finish. Patch surfaces where removed cables pass through building finishes.
- B. Provide access to existing paging system wiring connections remaining active and requiring access. Modify installation or install access panel.
- C. Extend existing paging circuits using materials and methods as specified.

### 3.2 EXAMINATION

- A. Verify interior of building has been protected from weather.
- B. Verify that work of other trades likely to damage paging system components has been completed.
- C. Examine building finishes that are to receive paging system components and cables for compliance with installation tolerances and other conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.
- D. Paging device locations and conduit routings shown on Drawings are approximate unless dimensioned.
  - 1. Locate paging system components as required to meet project conditions.
  - 2. Route conduits and cables as required to meet project conditions.
  - 3. Where conduit routing is not shown, and destination only is indicated, determine exact routing and lengths required to meet project conditions.

### 3.3 CONDUIT AND BOX INSTALLATION

- A. Furnish and install terminal blocks in the paging system rack. Provide an individual terminal for each speaker cable and arrange terminal blocks by paging system zone.

- B. Install an outlet box within 6 ft of each speaker assembly location in accessible suspended ceilings. Install a 1/2" flexible metal conduit from outlet box to speaker back-box located in accessible suspended ceilings.
- C. Install an outlet box at each wall-mounted speaker and each horn-type speaker. Conduit may be connected directly to speaker back-boxes located in non-accessible suspended ceilings.
- D. Install conduit system for paging system cables from the equipment rack in the telecommunications room to paging system outlet boxes.
- E. Refer to Section 26 0553, Raceways and Boxes for Electrical Systems, for additional installation requirements.

### 3.4 SPEAKER ASSEMBLY INSTALLATION

- A. Install speaker assemblies at locations indicated on the Drawings.
- B. Install speaker assemblies in accordance with the manufacturer's instructions. Have the manufacturer's installation instructions available at the construction site.
- C. Coordinate speaker assembly locations with building finishes, building structure, mechanical ductwork and grills, lighting fixtures, and automatic sprinkler system.
- D. Where the ceiling forms the protective membrane of a fire resistive assembly, install protective coverings over speaker assemblies in accordance with UL requirements.
- E. Do not support speaker assemblies by ceiling acoustical panels or by dry-wall ceiling or wall panels.
  - 1. Mount recessed speaker assemblies with at least two 3/4-inch support rails or with tile bridges attached to suspended ceiling support system.
  - 2. Where recessed speaker assemblies are supported from a suspended ceiling support system, install not less than two independent support rods or wires attached to the building structure.
  - 3. Install surface mounted speakers directly to outlet boxes that are supported from structure, framing, or suspended ceiling support system.
- F. Mount wall-mounted speakers with center not less than one foot below the ceiling grid but no higher than 9 feet above floor level.
- G. Adjust speaker baffle to fit adjacent surface.
- H. Connect speakers for 25V, 0.5 watt tap operation unless otherwise noted on the Drawings.

### 3.5 GROUNDING INSTALLATION

- A. Bond metallic paging system raceways to the paging system equipment cabinet using approved fittings.
- B. Use approved fittings and minimum 12 AWG bonding jumpers to make paging system raceways electrically continuous.
- C. Bond the paging system cabinet to the ground bar in the telecommunications room using 6 AWG ground cable.
- D. Refer to Section 26 0526, Grounding and Bonding for Electrical Systems, for installation requirements.

### 3.6 PAGING SYSTEM CABLE INSTALLATION

- A. Install paging system cables according to NECA 1 Standard Practices for Good Workmanship in Electrical Construction, the NEC, and requirements in this Section.
- B. Completely and thoroughly swab raceways before installing cable.
- C. Clean foreign matter from interior of boxes before installing cables.
- D. Store cable for 24 hours in the installation area ambient temperature before installing.
- E. Comply with Article 800 of the NEC.
- F. Terminate speaker cables on terminal blocks in the paging system equipment cabinet(s).
  - 1. Use an individual terminal block position for each speaker cable and arrange terminations by paging system zone.
  - 2. Dress the cables in a neat and orderly manner extending to the termination blocks from the bottom.
  - 3. Secure cables with Velcro<sup>®</sup> cable ties.
- G. The LANL Telecommunications Group will make connections from the paging system equipment cabinet to the paging system equipment rack.

### 3.7 IDENTIFICATION

- A. Uniquely identify each cable at both ends using a numbering scheme that complies with instructions from LANL Telecommunications Group.

- B. Identify paging system cable under provisions of Section 26 0553 Identification for Electrical Systems; use a tag-produced using a label printing machine.

### 3.8 FIELD QUALITY CONTROL

- A. Upon installation of wires and cables and before electrical circuitry is energized, show product capability and compliance with requirements and verify by testing that conductors are free from shorts and unintentional grounds.
- B. Inspect each installed speaker assembly for damage. Replace damaged components.
- C. Test installed paging system for proper operation and output volume.
  - 1. Make tests after the LANL Telecommunications Group has installed and connected the paging system equipment.
  - 2. Provide instruments to make and record test results.
  - 3. Replace or repair malfunctioning components then re-test.
  - 4. Adjust transformer taps as required to obtain a paging signal in each that is within 3 dB of the levels listed below.
    - a. Enclosed offices: 61 dBA (6 dB above a 55 dBA ambient)
    - b. Open plan offices: 76 dBA (6 dB above a 70 dBA ambient)
    - c. Laboratories: 76 dBA (6 dB above a 70 dBA ambient)
    - d. Corridors: 71 dBA (6 dB above a 65 dBA ambient)
    - e. Mechanical rooms: 91 dBA (6 dB above an 85 dBA ambient)

END OF SECTION

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Do not delete the following reference information:

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FOR LANL USE ONLY

This project specification is based on LANL Master Specification 27 3000, Rev. 1, dated April 27, 2006.